Reducing HIV risk in Botswana: a national cluster randomized controlled trial

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1. Executive summary

The Inter-ministerial National Structural Intervention trial (INSTRUCT) arose from a recognition by the Botswana HIV Prevention Think Tank of a need to test the impact of structural interventions for HIV prevention. CIET Trust undertook the five-year trial in collaboration with the Botswana National AIDS Coordinating Agency (NACA). While Botswana has done well in treating people with HIV and preventing mother to child transmission, it still has a high rate of new infections, especially among young women. Botswana has a range of structural support programmes designed to tackle poverty and improve livelihoods, including support to improve educational qualifications, support to set up and run small enterprises, and apprenticeships. These programmes were not designed to prevent HIV and do not target young women, who are at high risk of HIV through engagement in transactional and intergenerational sex as a way of supporting themselves.

In five randomly selected districts, INSTRUCT implemented a complex intervention to: identify vulnerable young women and help them to build the social and communication skills needed to apply successfully to support programmes, and put them in contact with local programme officers; build an enabling environment for these previously choice-disabled young women to start acting on prevention choices to protect themselves from HIV; and work with government programmes to help them become more accessible to vulnerable young women.

The project team implemented the intervention package in one district initially, moving into the other districts at the end of the second year. The project identified an enormous need for the intervention among young women, who knew little about available government support programmes and rarely applied successfully to any of these programmes. We identified a particularly vulnerable group of young women, living in the *masimo* (family agricultural lands around villages) where they have minimal access to services and face high risks of gender violence and HIV infection, and made efforts to include them in the intervention. To build an enabling community environment, trained facilitators used an evidence-based audio-drama to spark discussions about gender roles, gender violence, and HIV risk. This activity was enhanced by training government health education assistants and teachers to facilitate community and school BVV groups as part of their work, and by training traditional doctors (at their request) to facilitate community BVV groups. Inclining government programmes towards young women was challenging; using fuzzy cognitive mapping by young women and programme officers, followed by dialogue groups, helped these diverse stakeholders to co-design local solutions to identified problems of programme access. Within five years, we implemented the intervention package in all five districts.

The time required to change institutional culture and to shift mindsets of intended users of a structural intervention meant that, despite its considerable successes, the project could not fit in the five-year timespan allowed by IDRC. Since IDRC declined the request for additional funds, we focused on implementation research to guide interventions in a possible follow-on with Government of Botswana or other funding. The implementation research included: innovative use of social network analysis to reach and to engage vulnerable young women; follow up of young women participants about their experience of applying to programmes; follow up of BVV trainees about their use of BVV materials, and the factors related to this; and collection of narratives of change from young women to understand the impact the intervention had on their lives. The project emphasized involvement of government counterparts and marginalized young women. Some of the activities will be ongoing through government processes. NACA intends to use Global Fund funds to implement INSTRUCT activities within additional districts.

2. The research problem

Botswana has experienced a particularly severe HIV epidemic, with an adult HIV prevalence amongst the highest worldwide. The 2013 Botswana AIDS Impact Survey (BAIS IV) reported 24% of adults aged 15-49 were living with HIV. Botswana is recognized for its achievements in providing effective treatment for individuals with HIV and in prevention of mother to child transmission. The country has invested in national behaviour-change interventions that promote condom use, abstinence, safe male circumcision, and control of sexually transmitted infections. But new adult HIV infections remain common and estimated incidence fell only marginally between 2008 and 2013. There are still some 12,000 new infections each year, mainly among young women.

There is a compelling theoretical argument that structural factors influence the environment for HIV transmission. Observational studies recognize how social and economic factors, including gender inequality, gender violence, and poor access to education influence risk of HIV infection. Structural interventions aim to affect physical, social, cultural, organizational, community, economic, legal or policy aspects of the individual's environment. Creating education and economic opportunities for women and girls could lead to greater financial independence, reduce relationship power imbalances, increase influence in the household and, in turn, reduce choice disability and vulnerability to risky exposures. Although costly up front, structural interventions might be cost-effective and may have long term impact on the number of new HIV infections. They might have added socio-economic benefits including less poverty and more gender equality. Increasingly, HIV prevention agencies recognize the need for innovative approaches to address the structural determinants of HIV.

A systematic review to the end of December 2012 found 1,910 separate studies among 6,117 HIV prevention publications, including 321 randomized controlled trials (RCTs), 48 of which had HIV endpoints. To date, among 10 published RCTs of structural interventions with an HIV endpoint, only three reported a significant impact on HIV status or incidence.

The HIV Prevention Think Tank (a high level strategic advisory body in Botswana) in 2013 highlighted the need to test the impact of structural interventions for HIV prevention in Botswana and the (then) Minister for Presidential Affairs and Public Administration stated his intention to make the poverty eradication programme also assist with HIV prevention. From this arose the Inter-ministerial National Structural Intervention Trial (INSTRUCT), a cluster RCT (CRCT) implemented by a partnership between the Government of Botswana and CIET Trust. INSTRUCT builds on CIET Trust experience of an HIV prevention CRCT in Botswana, Namibia and Swaziland from 2008-2012.

INSTRUCT targeted marginalized young women as being particularly at risk of HIV, through structural factors leading to choice disability. Our operational definition of marginalized young women was young women aged 15-29 years, not in education and not in work. Most of the government structural support programmes in Botswana are available from the age of 18 years. Young women aged 18-24 years were accordingly especially targeted with help to access these government programmes. Implementation research during INSTRUCT confirmed that these young women rarely get support from the government programmes.

During INSTRUCT, we identified a sub-group of marginalized young women at especially high risk: those living in the *masimo* (family agricultural lands around the villages). Taken from school and sent to live here with older family members (such as their grandmothers), either because of their own pregnancy, or to assist in looking after the child of an older sister employed in a larger town, these

young women are at high risk of gender violence and sexually transmitted diseases, including HIV, and have very limited access to services. In the final year of INSTRUCT, we made special efforts to reach young women living *kwa masimo*, and we think future research and service efforts for prevention of gender violence and HIV should include a focus on these young women.

The overall objective of INSTRUCT was to reduce the number of HIV infections in five intervention districts in Botswana, particularly among marginalised young women, who bear the brunt of these infections. The project to date has gone some way towards this overall objective, although it has not yet reached it. We recognised in the third year of the project that it would be premature to expect a measurable reduction in HIV rates among young women, comparing intervention with control districts, as initially planned in the fourth year of the project. In discussion with the project officer, we opted instead to continue with the elements of the INSTRUCT intervention, with a particular focus on reaching especially vulnerable young women such as those living *kwa masimo*, and incorporating intervention research to help guide future interventions.

During the project, we carried out more intervention research than originally envisaged. This included methodological advances such as using social network analysis to understand how best to reach and engage hard-to-reach populations, and initiating the use of fuzzy cognitive mapping and deliberative dialogue to explore ways to make government support services more accessible to vulnerable young women. Our intervention research also included interviewing and collecting narratives from target populations, especially young women, and service providers.

In the final year of the project (2018) we continued with intervention research, including the write up and publication of findings from this research, and we carried out surveys of attitudes and practices among the population and among school children in one intervention district and one control district. We will complete the analysis and write-up of these surveys after the end of the project.

Overall, the project has confirmed the central role of structural factors on increasing the risk of gender violence and HIV among young women in Botswana. It has provided important insights into how to reach and engage young women in structural support programmes. And it has provided lessons about how to involve communities in Botswana and elsewhere in creating an enabling environment for young women to start to make positive decisions about their lives, including protecting themselves against HIV.

3. Progress towards milestones

All the project milestones, as specified in Attachment B of the Grant Agreement, have been achieved. The final technical report is this report, which is being submitted alongside the final financial report. The table below summarises the project milestones and their achievement dates.

Milestone	Due date	Submitted	Approval
Project commencement date	1 Jan 2014	n/a	n/a
First technical progress report	Jan 2015	Jan 2015	Approved by project officer
First financial report	Feb 2015	Feb 2015	Approved by finance officer
Second technical progress report	Jan 2016	3 Feb 2016	Approved by project officer
Second financial report	Feb 2016	Feb 2016	Revised report approved by finance officer March 2016
Third technical progress report	Jan 2017	3 Feb 2017	Approved by project officer
Third financial report	Feb 2017	Feb 2017	Approved by finance officer
Fourth technical progress report	Jan 2018	Jan 2018	Approved by project officer
Fourth financial report	Feb 2018	Feb 2018	Revised report approved by finance officer March 2018
Final technical report	Jan 2019		This report
Final financial report	Feb 2019		To be submitted

4. Synthesis of research results and development outcomes

Progress with objective 1

Objective 1. *Plan, test, train, and mobilize resources and institutions to scale-up the structural interventions in a recent three-country trial on a broader scale in Botswana, and re-gear government structural support programmes in favour of the most HIV-vulnerable, especially young women.*

The project has largely achieved this objective. Much of the work to plan and test the structural interventions of INSTRUCT took place during the first year of the project.

- Selection of the intervention districts and planning, mobilisation and training for interventions in one of the selected districts, as well as at national level.
- Selection of the five intervention districts, using a blocked allocation to allow for district size, geographic location and HIV prevalence (as measured in the BAIS IV survey in 2013).
- The National AIDS Coordinating Agency (NACA) and CIET working together to inform and involve relevant stakeholders (mainly government ministries) in the INSTRUCT trial, including a series of meetings and discussions.
- Three design focus groups used to guide the development of a questionnaire for an engagement survey in one implementation district.
- Drafting, approval, and piloting of leaflets about the major government structural support programmes
- Creation and approval of short video clips about the government structural support programmes
- Updating of the Beyond Victims and Villains (BVV) audio-drama using findings from a 2012 Botswana survey and recording the episodes in Setswana

- Translation of the BVV audio-drama into Sekalanga and Sekgalagadi, and recording the episodes in these languages for use in two of the districts
- Approval from the Ministry of Education for training teachers to use the BVV materials in schools
- Agreement from the Ministry of Health for training Health Education Assistants to use the BVV materials with groups in the communities

Supporting the re-gearing of the government structural support programmes in favour of HIV-vulnerable young women began in the first year and has been ongoing throughout the project. The support programmes include those to help people improve their educational qualifications and to improve their livelihoods through small enterprises and apprenticeships. They were not designed to contribute to HIV prevention and are not geared towards young women. Programmes for women from the gender affairs department are restricted to women over 35 years old, while programmes for youth can be complicated to apply to and tend to favour male youth, and better educated youth. Working with these programmes is a complicated task, as they are provided through at least five different government ministries, and in some cases planned and "owned" by one ministry centrally but implemented at district level through a different ministry. During the first and second years, the project team, with NACA, engaged with relevant ministries centrally and in the first implementation district. The team then worked with local programme officers of the various support programmes, as part of the INSTRUCT intervention in the implementation districts (see below).

In the final two years of the project, we intensified support for re-gearing of government structural support programmes, using fuzzy cognitive mapping to document the views of vulnerable young women and of programme officers about the factors limiting the access of young women to the programmes, and facilitating dialogue groups to co-design solutions to the identified problems. A doctoral student from the department of family medicine at McGill university worked on this aspect of the project for her doctoral thesis. This work is ongoing beyond the end of the project, with further analysis of the created cognitive maps and collaboration with NACA to support greater access to support programmes.

Progress with objective 2

***Objective 2**. Implement the interventions district-wide in a first wave or group of five randomly selected districts.*

The project has achieved this objective. Interventions took place in the first implementation district during the first two years, and across the other four implementation districts in the next three years. We delayed the implementation in the other four districts until the end of the second year to allow learning from full implementation in the first district. Implementation in the first district provided crucial lessons for implementation in the other four districts. The INSTRUCT intervention package has three elements: support for young women to begin making positive protection choices and to access government support programmes; creation of an enabling environment for young women to make choices and to change the social status of young women in their communities; and working with government support programmes to make them more inclined to the needs of young women.

We describe here the way the project supported these three elements in the intervention districts, including the lessons learned from the first district and applied in the other four districts. We took a participatory research approach throughout. The intervention of the trial was the approach to cover the three elements; the details of activities to address these three elements varied between districts

and between communities within each district, as they adapted them to their own context. The INSTRUCT intervention was a catalyst, with the young women themselves, programmes, and communities taking actions as a result of their participation in the INSTRUCT intervention.

1. Supporting young women to make choices and access government support programmes

Identifying and engaging young women

In the first implementation district (Moshupa sub-district) we undertook an initial **engagement survey** in the first year of the project. This survey attempted to reach and administer a questionnaire to all young women aged 15-29 years old in all communities of the district. The questionnaire asked about their socio-economic and educational status, their sexual experience and behaviours, and their knowledge and experience of relevant government structural support programmes. In the same interview, the fieldworkers shared video clips about the available programmes and asked young women if they would be interested to attend a workshop to help them access these programmes. The engagement survey collected data from 1,493 young women in Moshupa. Findings confirmed the low level of knowledge of many government support programmes and the even lower level of successful applications to the programmes among young women. The findings have been presented in Botswana and internationally (see Outputs) and are summarised in Annex 1.

The approach in the engagement survey of trying to visit every household to find and interview young women was time-consuming and still missed many young women who were not present when houses were visited (even with repeated visits). This experience in the first district led to development of an innovative approach to reaching vulnerable using **social network analysis** and **respondent driven recruitment**. A doctoral student from the department of family medicine at McGill university undertook his doctoral thesis research on this issue. The project took a modified approach to identifying and engaging young women in the other four districts, making use of social networks and respondent driven recruitment. In these districts, the district field teams undertook an ongoing **recruitment survey**. In each community in turn, they identified young women aged 18-24 years, not in education and not in paid employment, based on a combination of house to house visits, information from such young women about others like themselves, and information from key informants such as health workers, social workers, and members of the village development committee. Over two to three days the field teams (themselves young women from the district) interviewed the identified eligible young women and invited them to a workshop to take place over the subsequent two days. This approach was successful in finding young women to attend workshops in their communities and over time accumulated a database of their situation (socio-economic, educational, sexual behaviour and knowledge and experience of programmes). Almost all the young women contacted by the field teams were interested to attend a workshop that could help them to access government support programmes and improve their livelihood.

Findings from the recruitment survey and from the social network analysis have been published (see Outputs). Analysis of the recruitment survey confirmed that these vulnerable young women (not in education and not in work) reported high levels of gender violence and risky sexual behaviours and that few had accessed government support programmes. The only programme accessed to any extent was *Ipelegeng*, a decades-old rotating minimum-wage arrangement that offers no training or support for other employment. Excluding *Ipelegeng*, young women with less education were *less* likely to have benefited from any support programme.

A key intention in the identification and engagement of young women was to ensure that we reached the most marginalized young women, least able to access government support programmes

and most at risk of gender violence and HIV. During implementation of the project, we identified a sub-group of marginalized young women at especially high risk: those living in the *masimo* (family agricultural lands around the villages). Taken from school and sent to live here with older family members (such as their grandmothers), either because of their own pregnancy, or to assist in looking after the child of an older sister employed in a larger town, these young women are at high risk of gender violence and sexually transmitted diseases, including HIV, and have very limited access to services. In the final year of INSTRUCT, we made special efforts to reach these young women living *kwa masimo*, and we think future research and service efforts for prevention of gender violence and HIV should include a focus on these young women.

Workshops to support young women and help them apply to government programmes

These workshops, which we called "focussed workshops" within the project, took place in all communities of the five implementation districts. As a measure of our success in identifying and engaging vulnerable young women (see above), there was a high demand for places in these two-day workshops, so that even in small communities we often needed to facilitate more than one workshop. In larger communities we ran a series of workshops to provide the opportunity for all the interested young women to attend.

The workshop dates and locations and the numbers of participants are summarised in Annex 2. In total, across all five implementation districts, some 2,515 young women attended 98 workshops.

The workshops took place in a variety of venues, including school premises, Village Development Committee halls, meeting rooms of different government services, or the village *kgotla* (meeting place). Community leaders usually made such venues available as part of their commitment to the activities of INSTRUCT. Where possible, the district team travelled to the communities for these workshops each day. In some more remote communities, the district team camped in the village, or stayed in basic VDC accommodation for about a week, to undertake the recruitment survey followed by the workshop.

We designed the workshops to be highly interactive, with a minimum of formal "presentations". They included a series of activities for the participants, with lessons from the activities drawn out by the facilitators after each activity. The topics included activities designed to build confidence and self-esteem, activities to illustrate types of communication (passive, aggressive, assertive), and activities to build communication skills. The young women participants each described their life path up to this point, their future aspirations, and the support programmes they were potentially interested in. In the second day of each workshop, we invited local programme officers from the government support programmes to attend, give a presentation about their programme, answer questions from the young women, and discuss with them (as a group or individually) how they could apply to and get support from the programme.

A team of young women from each district carried out the recruitment survey and facilitated the focussed workshops in their own district, led by a district coordinator and supported by the central research team. Usually the workshops involved a maximum of about 25 participants, to allow for the interactive nature of the activities and provide opportunity for all of them to get the information they needed from local programme officers attending the workshops. Sometimes higher numbers attended with more facilitators allowing for split activities. The involvement of young women from the districts was in itself a good opportunity for building their capacities; they received detailed training and on-the-job support and many subsequently became capable of organising the workshops with minimal support.

Following the workshops, the district team and local programme officers worked with some of the participants to provide specific support identified during the workshops as needed to help them access programmes. This was sometimes as basic as helping them to obtain an ID card (*omang*), without which it is not possible to apply to any government programmes. The district team also tried to contact all the young women participants to find out their progress since the workshop, especially their progress in applying for government support programmes they had declared an interest in during the workshops. This follow-up indicated that most of the workshop participants had made programme applications; at the time of the follow-up many of them were still waiting to hear about the result of their application. The findings from the follow-up of workshop participants are summarised in Annex 2.

2. Building an enabling environment

The project used the BVV audio-drama to create an enabling environment for young women to start making protective choices and change their position within their communities. This eight-episode audio-drama uses evidence from schools and population surveys in Botswana. The audio-drama was updated for this project, using data from a 2012 survey. The episodes cover issues of gender roles, gender violence, transactional and inter-generational sex, choice disability, and HIV risk. After each episode, the facilitator leads a discussion in which the participants in the group are encouraged to look for local solutions to the issues raised in the episode.

The project aimed to use the BVV audio-drama to facilitate discussions with all segments of the population in communities: school children from age 11 upwards; young women; young men; older women; and older men. The approach was to train facilitators to use the BVV materials in communities and schools. The intensive training, over three days, familiarised people with the BVV materials and trained them in how to facilitate the group discussions about each BVV episode. The types of people trained as BVV facilitators evolved during the project, mostly in response to suggestions from the districts and communities.

<u>BVV in the communities</u>

In the first implementation district, we began by training **BVV community facilitators**: women and men already active in groups within their communities and interested to be trained to use the BVV materials to support their work with these groups. While it was possible to identify and train suitable people active in their communities, there was quite a high turnover of these community facilitators, and the sustainability of this approach was limited.

When the implementation of interventions spread to the other four districts at the end of the second year, the head of health education in one of these districts proposed that we should train **health education assistants** to use the BVV materials. Health education assistants are attached to clinics and have a role in supporting community members to adopt healthy behaviours, as well as conducting home visits to people with conditions such as tuberculosis, and supporting clinics to monitor child health. At the time of our project, the Ministry of Health was increasing the number of health education assistants and encouraging an increase in the proportion of their time spent outside the clinics and within the community. Training health education assistants to use BVV materials had many advantages: it gave them some structured material to use to open interaction with different community groups; it was an activity that could be incorporated into their annual appraisal; and it supported sustainability of the BVV activity within a government service, with a modest investment in future training. We subsequently provided BVV training for health education

assistants in all the implementation districts. Later follow up suggested that most of the trained health education assistants were using the materials and finding them helpful.

In another of the four intervention districts where work began at the end of the second year, the head of the association of **traditional doctors** in the district proposed that traditional doctors would be interested to have training to use the BVV materials and would be able to use them with community groups, including groups of men (who are notoriously difficult to engage in such activities). Beginning in this district and extending to all the intervention districts, we provided BVV training for groups of traditional doctors. Again, later follow-up indicated most of them were using the materials and actively running BVV groups, of both men and women.

The numbers of community facilitators, health education assistants, and traditional doctors trained to facilitate BVV groups in their communities are shown in Annex 3. Overall, we trained 636 people: 315 women and 321 men. The results of the follow-up of BVV trained health education assistants and traditional doctors have been presented in conferences and published (see 0utputs section).

BVV in schools

During the project, we trained at least one teacher (usually the designated guidance teacher) from each primary and secondary school in the intervention districts. Again, the training was over three days and covered the content of the materials as well as the method of facilitating discussion of the episodes by the children. Such open discussion sessions are not typical of the teaching methods in Botswana schools. About one year after the training, follow up of teachers and schools indicated that many teachers were using the materials and reporting good responses from the students, but that there were challenges for using the materials, mostly related to finding time within the schedule.

Annex 3 shows the numbers of teachers trained in using BVV materials. Overall, we trained 197 teachers: 146 women and 51 men. The findings of the follow up of teachers have been presented in an international conference and submitted for publication.

3. Working with government support programmes

This element of INSTRUCT aimed to raise awareness among policy makers, planners, managers, and programme officers for the relevant government support programmes about the lack of access of young women to their programmes and seek their engagement in improving the situation. Despite efforts throughout the project, progress with this element has been slow.

At national level

During the first months of the project, the project team and NACA held meetings with the relevant government ministries at national level: one to one meetings, workshops, and round table discussions. It became apparent early on that the programmes themselves, certainly at national level, did not have good figures for gender and age profiles of programme beneficiaries, let alone programme applicants. We had to find such figures ourselves, by working with the programme offices in individual districts. A senior officer in one ministry was under the impression that “most of the programme beneficiaries are female” until we showed him figures from district offices of the programme indicating that two thirds of the beneficiaries were male.

As results from the engagement survey in the first district became available, we shared these with individual ministries, who were certainly interested and sometimes disappointed to learn of the low knowledge about and access to their programmes by young women. This did not immediately translate into actions to improve the situation. It was difficult to focus the attention of the senior officers on the plight of young women, as they were more concerned with showing overall uptake of their programmes and demonstrating effective use of their funds.

Nevertheless, there has been high level political commitment to the INSTRUCT approach to HIV prevention before the project began, and throughout the project. In 2015, we were invited to present the INSTRUCT background and methods and the findings of the engagement survey at the annual meeting of the National AIDS Council. This is the highest HIV policy body in Botswana and the annual meeting is attended by senior officers from all ministries, as well as relevant NGOs and funding agencies. The Chairman of the council, who is now the President of Botswana, spoke strongly in favour of ministries acting to make their programmes more accessible to vulnerable young women.

We have continued to speak to ministries at national level, updating them on the work of the project and informing them of the situation "on the ground" and the hurdles faced by young women trying to access their programmes.

<u>At local level</u>

Within each intervention district, the INSTRUCT team was actively involved in the District Multi Sectoral AIDS Committee (DMSAC). This committee, chaired by the District AIDS Coordinator (DAC), meets approximately monthly and has representation from all the lines ministries working in the district. In each district we also worked with the District Commissioner (DC), who heads the local government and who supported the work of INSTRUCT by directing officers from different ministries to attend meetings and workshops and provide logistic support for activities. The involvement of the DC and DAC certainly helped to encourage the involvement of individual programme officers in INSTRUCT activities, but nevertheless actual involvement depended on individual officers. Some were very active: they attended all focussed workshops and they made efforts to help young women, individually and as groups, to make successful applications to programmes. Others did the minimum, managing to find reasons to skip workshops, and not being responsive to the needs of young women.

During the last two years of the project, an additional exercise explored the reasons for young women not benefiting from government support programmes, from the point of view of the young women and from the point of view of programme officers. In each intervention district, we convened a group of young women and a group of programme officers and used the technique of **fuzzy cognitive mapping** to get a visual representation of the factors hindering access of young women to the programmes, the interactions between these factors, and the strength of the causal links. We subsequently brought together these two groups, compared their maps, and discussed potential solutions to identified problems in deliberative dialogue groups. We believe this approach has potential for sparking change, at least at local level. Further analysis of the maps and dialogue groups is underway, as thesis research of a doctoral student from McGill University, supported by a Vanier scholarship.

Progress with objective 3

***Objective 3**. Measure the impact of these on young women aged 15-29 years living in those districts, compared with young women in the next wave of five randomly selected districts and adjust the interventions on the basis of the results of this first wave and apply the lessons learned to the design of the next wave of the intervention roll-out;*

We recognised in the third year of the project that it would be premature to expect a measurable reduction in HIV rates among young women, comparing intervention with control districts, as initially planned in the fourth year of the project. Even before the initiation of the project, we recognised that we might face this possibility and discussed this fully with the IDRC counterpart.

Structural interventions face a dilemma: if they are too individually focused and small scale (for example, conditional cash transfers for remaining in school), they risk not being truly structural; but large scale structural changes to the environment for young women are complex to achieve and take time to bear fruit. Our experience in INSTRUCT led us to believe that it was unlikely that we would achieve measurable shifts in HIV risk of young women within the time frame of the original project. In discussion with the project officer, we opted instead to continue with the elements of the INSTRUCT intervention, with a particular focus on reaching especially vulnerable young women such as those living *kwa masimo*, incorporating intervention research to help guide future interventions. We requested additional time and resources for the project to continue the intervention and to generate measurable impact. This has unsuccessful with IDRC and we are seeking funding from elsewhere to complete the work.

In the final year of the project, after full discussion with the IDRC counterpart, we modified our approach to measuring impact and focused on implementation research to help understand the way the interventions worked, the challenges of effective implementation, and the changes experienced by those participating in the interventions, both expected and unexpected.

Implementation research

Aspects of the implementation research are published separately and summarised here.

<u>Social network analysis</u>

Recognising the challenges of reaching the most vulnerable young women, we carried out social network analysis in four communities of one district to help understand how to use social networks to help identify the whole population of vulnerable young women within a community. Results of this work have been presented and published (see Outputs section)

<u>Follow up of young women after attending focussed workshops</u>

This follow up activity helped to confirm how many of the young women who attended workshop subsequently proceeded to apply to programmes and gave insights into their experience when they did apply. The findings from this follow up are summarised in Annex 2.

<u>Follow up of different groups trained to use BVV materials</u>

During the project, we followed up those who had attended BVV training among three groups: health education assistants, traditional doctors, and teachers. As well as asking about their use of BVV materials with different groups in the community and in schools, the follow up asked about the factors that helped the trainees to use the materials, the factors that made it difficult for them to

use the materials, and their experience of using the materials. The findings from these follow up exercises have been presented and published (see Outputs section).

Narratives of change from young women

We used the Most Significant Change technique to collect narratives of changes in their life that young women attributed to their involvement in the INSTRUCT intervention, mostly their attendance at focused workshops and subsequent contacts with government support programmes. The analysis of these narratives is underway and will be published after the end of the project.

Interim measurement of impact of INSTRUCT interventions

In the final year of the project, we undertook an interim measurement of impact, collecting data from populations and from school children in the first intervention district and one district in the next wave of districts under the stepped wedge design (as a control). The focus of the measurement was on steps in the CASCADA sequence of behaviour change (Conscious knowledge, Attitudes, Subjective norms, intention to Change, Agency, Discussion, and Action). The analysis of the findings is underway and we expect to publish the findings during the coming year.

Population survey

Field teams interviewed 422 people in 20 communities in Moshupa sub-district and 656 people in 12 communities in a control (non-intervention) district. Among the people interviewed in Moshupa, 231 were young women (16-29 years) who had attended focussed workshops, and 191 were men and women who had participated in BVV groups (25 young men, 94 older men, and 97 older women). In the control district, the age and sex composition of the survey population was similar (365 young women, 37 young men, 106 older men, and 147 older women).

Schools survey

School children completed a facilitated self-administered questionnaire (a facilitator reading out questions at the front of the class, and children entering their responses into hand held android tablets). In Moshupa, the survey covered schools that had actively implemented the BVV programme. Some 970 children (497 boys and 473 girls) in primary schools and 279 (140 boys and 139 girls) in secondary schools completed a questionnaire. In the control district, 746 children (355 boys and 391 girls) in primary schools and 127 (67 boys and 60 girls) in secondary schools completed a questionnaire.

Progress with objective 4

Objective 4*. Document costs of the intervention package in relation to its outcomes, to calculate costs per case averted and confront the cost implications of its wider roll-out*

During the project, we have accumulated data on costs of the intervention package as implemented. We will now calculate the costs of ongoing implementation of the elements of the intervention, without the costs of the implementation as a research project. In doing this, we will estimate the costs of the government taking over specific INSTRUCT elements: the workshops with young women and the BVV audio-drama groups. Much of the BVV costs are already covered by government, as the groups in the communities and schools were facilitated by government officers (health education assistants and teachers), supported by voluntary inputs from community facilitators and traditional

doctors. The outstanding costs are recruitment for and facilitation of the focussed workshops and the training sessions for BVV facilitators.

We expect to undertake this financial analysis during the coming six months. This is not only with a view to publication, but also because the government of Botswana is proposing to implement INSTRUCT activities in further districts, using funding they have received from the Global Fund.

5. Methodology

Methodological approach

The project took a **participatory research** approach, meaningfully involving stakeholders at all stages. The idea of undertaking a trial of a structural intervention for HIV prevention arose from the Botswana HIV Prevention Think Tank, a high-level government advisory group convened by the National AIDS Coordinating Agency (NACA). NACA and CIET jointly approached IDRC with a proposal for the INSTRUCT trial, with the strong support of the minister responsible for NACA, Hon Mokgweetsi Masisi, who has subsequently become the President of Botswana. NACA and CIET developed a Memorandum of Understanding for joint work, including the INSTRUCT trial, and NACA has worked closely with CIET throughout the project, including personnel to work with the research team and coordinate with government ministries.

The research team co-designed the interventions of INSTRUCT with the intended beneficiaries and other stakeholders. Focus groups of young women highlighted the difficulties they faced with accessing government support programmes and the sort of activities that they felt could help them to apply to programmes successfully. The details of the focussed workshops evolved during the project, as district teams of young women and workshop participants gave feedback and suggestions. Programme managers and programme officers, as well as young women, gave their inputs into designing and creating attractive materials, including leaflets and video clips, about the programmes and how to apply for them. The pre-existing Beyond Victims and Villains audio-drama (BVV) incorporates the views and concerns of men and women of all ages, including school children, expressed in interviews and focus groups in Botswana and neighbouring countries. In the BVV discussion groups during the project, including school children and adult men and women of all ages, the groups themselves decided on how the issues raised affected their communities and considered what actions they could take to resolve the problems they identified.

One clear outcome of the participatory approach was the involvement of health education assistants and traditional doctors as BVV facilitators. Involvement of government stakeholders at district level led to the suggestion of training health education assistants to use BVV materials, which became a successful part of the project in every district. The open approach of the project team allowed for the involvement of traditional doctors as BVV facilitators, at the suggestion of a leader of a traditional doctors' association.

Fuzzy cognitive mapping and deliberative dialogue used in the project gave equal weight to the knowledge and views of young women and programme officers and gave them the opportunity to co-design strategies to improve access of young women to government support programmes. The proposed strategies differed between the intervention districts, reflecting the different realities of implementing the support programmes in different areas.

Research methods used

This was mixed methods research, with both quantitative and qualitative elements. Some of the methods used are also described in other sections. The following section summarises important points about the methods and their use in the project.

Electronic data collection

Electronic data collection proved highly effective during the project. In both the engagement survey and the subsequent recruitment survey, the field workers conducted the interviews and recorded responses on android tablet devices, using ODK Collect software. Supervisors sent the completed records to a central server (housed in Botswana), and the research team downloaded the dataset for analysis. Advantages include the ability to programme the recording of responses to avoid errors, the saving in resources needed for data entry from manually recorded responses, and immediate access to datasets during training and data collection allowing real-time identification and correction of errors. The research team also used electronic data collection for the follow up of teachers and health education assistants after BVV training. In the interim impact measurement, fieldworkers used the android tablets to record responses from the survey of adults, and school children also used android tablets to record their responses to the facilitated questionnaire in schools. This latter use of the android tablets for self-completion of a questionnaire was innovative and proved very successful.

Focussed workshops

These workshops aimed to equip young women with social and communication skills to help them to apply successfully to government support programmes. The workshops also included activities to help build the self-esteem of the participants, for many of them very low. A psychologist with extensive experience of working with young people at risk of HIV in southern Africa and elsewhere supported the design of the workshops, making them very interactive and with the learning achieved by facilitated discussions after the participants experienced the activities, rather than through presentations to the participants as audience.

The facilitation of the workshops presented a challenge; we wanted young women from the districts to facilitate the workshops, but the design of the workshops, with the facilitator drawing out lessons learned from activities, meant that successful facilitation required considerable skill. The central research team, who were skilled and experienced facilitators and involved in the design of the workshops, conducted initial workshops in each district, together with the selected district coordinator. They noted young women who had the potential to form the district team and offered them training in facilitating the workshops, including co-facilitation until they became confident and able to conduct the workshops without the direct supervision of the central team. This apprenticeship approach generally worked well.

In the initial workshops, especially in the first implementation district, the follow up of the participants after the workshop was not very structured and sometimes the district team lost track of the participants. The young women participants are a mobile group, often shifting their residence for example to be with another part of their family, or moving in with their boyfriends, or because they find work in some other town, or because they are sent to live in the *masimo*. They also frequently change their cell phone numbers. Later in the project, the team became better at following up the young women after workshops and this allowed us to collect information about

their subsequent applications to programmes, returning to education, or finding employment (see Annex 2).

Beyond Victims and Villains audio-drama (BVV) discussion groups

The BVV discussion groups in this project are an example of socialising evidence for participatory action (SEPA) which CIET has used effectively in interventions in different contexts, including childhood immunisation in Pakistan, community mobilisation for dengue prevention in Mexico and Nicaragua, and universal home visits to improve maternal and child health in Nigeria. Rather than telling people what they should do, or not do, SEPA shares local evidence and communities and households themselves decide on what action to take. The common intervention is sharing and discussing the evidence; the actions taken as a result are decided by the people concerned and differ between places, depending on the local context.

Social network analysis

The use of social network analysis to help reach and engage the most vulnerable young women was innovative. Typically, social network analysis involves defined groups that can be fully enumerated, such as those working for a company or listed members of an organisation. In this case, the intention was to reach and recruit all vulnerable young women in each community, but their number and identity was not known in advance. We successfully applied social network analysis and developed a method for reaching as many as possible of these young women, combining peer recruitment with house to house visits and input from key community informants. The work on social network analysis not only helped recruitment of young women in INSTRUCT, and potentially for government support programmes in the future, it also made a methodological contribution to the developing field of social network analysis.

Fuzzy cognitive mapping

Fuzzy cognitive mapping is a participatory method that allows different expert groups (including patients, community members, service providers, planners and policy makers) to create maps of their knowledge about causal associations with outcomes (such as clinical conditions, behaviours, or service access). The maps include the links between causes and the outcome, direct and indirect, with estimates of the strength of links with the outcome and between identified causes. The maps produced by different groups can be compared, either visually or using graphical software, network analysis, and techniques such as transitive closure to quantify links and “walks” from identified causal factors through to the outcome. The maps can also be compared with findings from the literature about associations with the outcome. The technique gives weight to the knowledge of individuals and populations affected by the outcome, as well as to the findings of research. The use of cognitive maps increases the value placed on local knowledge, which may differ from findings of research undertaken in different settings and with limited groups.

In the INSTRUCT project, finding common ground between vulnerable young women who could benefit from government support programmes and government officers planning and implementing the programmes was difficult. To address this difficulty, towards the end of the project, we undertook fuzzy cognitive mapping sessions with groups of young women and groups of programme officers around the outcome of “young women not accessing government support programmes”. Examples of the maps produced are shown in Annex 4. During the project, we held sessions with mixed groups of young women and programme officers to compare their maps and find common ground, feeding into deliberative dialogue about potential solutions to issues both groups felt were

important hurdles to programme access. Further analysis of the maps using network analysis and transitive closure is underway and will be reported after the end of the project.

Narratives of change

To increase understanding of the way in which the focussed workshops could impact on the lives of the young women participants, we collected stories from participants in the focussed workshops about the most significant change they perceived in their lives resulting from their participation in the project. The Most Significant Change narrative technique was developed to support project management, providing feedback to different tiers of management from participants about intended and unintended consequences of the project. The stories can also be analysed thematically to understand the possible effects of the intervention from the viewpoint of participants. The technique is qualitative and does not provide a measure of the "average" or "usual" impact of an intervention; rather it highlights what can happen, good and bad, after participation.

We collected narratives in the last six months of the project. Their analysis is ongoing and results will be available during the coming year.

6. Project outputs

The proposal for this project was submitted prior to the introduction of the IDRC open access policy in July 2015. Therefore, the proposal did not include an open access dissemination plan. However, we support the principles of the open access policy and we are making efforts to make project outputs open access, either through open access publication of articles, or by using the "green open-access" approach and posting accepted versions of articles in a suitable repository.

Articles published or in press

1. Loutfi D, Andersson N, Law S, Kgakole L, Salsberg J, Haggerty J, Cockcroft A. Reaching marginalized young women for HIV prevention in Botswana: a pilot social network analysis. Global Health Promotion, 2019 (in press)
2. Loutfi D, Andersson N, Law S, Salsberg J, Haggerty J, Kgakole L, Cockcroft A. Can social network analysis help to include marginalized young women in structural support programmes in Botswana? A mixed methods study. International Journal for Equity in Health, 2019;18:12. https://doi.org/10.1186/s12939-019-0911-8
3. Cockcroft A, Marokoane N, Kgakole L, Kefas J, Andersson N. The Inter-Ministerial National Structural Intervention trial (INSTRUCT): protocol for a parallel group cluster randomised controlled trial of a structural intervention to reduce HIV infection among young women in Botswana. BMC Health Services Research, 2018;18:822 https://doi.org/10.1186/s12913-018-3638-0
4. Cockcroft A, Kgakole L, Marokoane N, Andersson N. A role for traditional doctors in health promotion: experience from a trial of HIV prevention in Botswana. Global Health Promotion, 2018. Published online https://doi.org/10.1177/1757975918785563
5. Cockcroft A, Marokoane N, Kgakole L, Tswetla N, Andersson N. Access of choice-disabled young women in Botswana to government structural support programmes: a cross-sectional study. AIDS Care, 2018, 30(Sup2):1-4. DOI:10.1080/09540121.2018.1468009

6. Cockcroft A, Marokoane N, Kgakole L, Maswabi B, Mpofu N, Ansari U, Andersson N. Young women's access to structural support programmes in a district of Botswana. BMC Infectious Diseases 2016; 16 (Suppl 2): P5 [Published extended abstract]

Articles submitted

7. Loutfi D, Law S, Andersson N, Cockcroft A. Stakeholder recommendations to increase access of marginalized young women to government support programs in Botswana: evidence-based group discussions. Submitted: Global Health Science and Practice, January 2019

8. Cockcroft A, Marokoane N, Kgakole L, Mhati P, Tswetla N, Sebilo I, Andersson N. Acceptability and challenges of introducing an educational audio-drama about gender violence and HIV prevention into schools in Botswana: an implementation review. Submitted: AIDS Care, August 2018

Articles in preparation and planned

Note that article titles are provisional at this stage.

1. Cockcroft A et al. Impact of an educational audio-drama about gender, gender violence and HIV on attitudes and reported behaviour among primary and secondary school children in Botswana.
2. Cockcroft A, et al. Interim measurement of impact of a structural intervention for livelihood support and HIV prevention on attitudes and reported behaviour in Botswana.
3. Van der Wal R….Cockcroft A, Andersson N. Fuzzy cognitive mapping to explore views of young women and program officers about obstacles to use of government support programs by young women in Botswana.
4. Van der Wal R….Cockcroft A, Andersson N. Narratives of change among marginalized young women attending workshops to help them access government support programs in Botswana.

Presentations

1. Van der Wal R. Bottlenecks and red tape reduce access to government support programs by Botswana's most vulnerable young women. RRSPQ Scientific Day, Québec City, Canada, 4 December 2017. (Oral presentation of poster at the CUGH in Washington DC in April 2017).
2. Marokoane N, Kgakole L, Cockcroft A, Andersson N. Implementation of an educational evidence-based audio-drama about gender roles, gender violence and HIV in schools in a district of Botswana. Presentation at AIDS Impact conference, Cape Town, 13-15 November 2017. http://www.aidsimpact.com/abstracts/-KohpxpBCNQGOg565jP (Poster)
3. Cockcroft A, Marokoane N, Kgakole L, Tswetla N, Andersson N. Young women at high risk of HIV do not access government support programmes in Botswana; cross-sectional survey during the INSTRUCT cluster randomised controlled trial. Presentation at AIDSImpact conference, Cape Town, 13-15 November 2017. http://www.aidsimpact.com/abstracts/-KrV59XZUzchFZmI5aN1. (Poster)
4. Cockcroft A, Kgakole L, Marokoane N, Andersson N. Working with traditional doctors towards HIV prevention in Botswana. Presentation at AIDSImpact conference, Cape Town, 13-15 November 2017. http://www.aidsimpact.com/abstracts/-KohoBpntetO_9jusFUZ. (Oral presentation by L Kgakole)
5. Loutfi D, Kgakole L, Andersson N, Cockcroft A. Reaching marginalized young women for HIV prevention in Botswana: a pilot social network analysis. Presentation at AIDS Impact conference,

Cape Town, 13-15 November 2017. http://www.aidsimpact.com/abstracts/-KoiOBwcKw4Ne99E6OpF. (Oral presentation)

6. Van der Wal R, Andersson N, Cockcroft. Align government support programs in favour of vulnerable young women: fuzzy cognitive maps and deliberative dialogue in Botswana. Presentation at AIDSImpact conference, Cape Town, 13-15 November 2017. http://www.aidsimpact.com/abstracts/-Kom3eQLrEm1WeMcOvkn. (Oral poster presentation)
7. Loutfi D, Law S, Andersson N, Cockcroft A. HIV prevention in Botswana: Who do marginalized young women turn to for support? McGill Global Health night, Montreal, 7 November 2017. (Poster).
8. Van der Wal R. Access of young women to government support programs in Botswana. McGill Global Health night, Montreal, 7 November 2017. (Poster).
9. Cockcroft A, Marokoane N, Kgakole L, Andersson N. Beyond traditional boundaries: health education assistants in the INSTRUCT trial of structural interventions for HIV prevention in Botswana. Presentation at University of Botswana Family Medicine and Primary Care conference, 8 September 2017. (Oral presentation)
10. Ran van der Wal, Anne Cockcroft, Neil Andersson. Community voices in government decision-making aim to improve support programs in Botswana. Global Health and Innovation Conference (GHIC), New Haven, USA, 22-23 April 2017 (Oral presentations). - Semi-finalist for the USD 20,000 GHIC Innovation Prize
11. Ran van der Wal, Anne Cockcroft, Patricia Itumeleng, Leagajang Kgakole, Neil Andersson. Bottlenecks and red tape reduce access to government support programs by Botswana's most vulnerable young women. 8th Consortium of Universities for Global Health (CUGH), Washington DC, USA, 7-9 April 2017 (Poster). Winner of Lancet Student Poster Competition in Infectious Diseases Track (USD 500)
12. David Loutfi. HIV Prevention in Botswana: Reaching out to vulnerable young women through their support networks. January 2017, St Mary's Hospital Research Centre Seminar, Montreal, Canada. (Oral presentation)
13. Loutfi D, Cockcroft A, Salsberg J, Law S, Andersson N. Preventing HIV in Botswana: Using Social Network Analysis to identify and engage young women in a structural intervention for HIV prevention. Canadian Association for Health Services and Policy Research conference. Toronto, Canada. 9-12 May 2016. (Oral presentation)
14. Cockcroft A. Invited presentation. Structural interventions to improve health: re-wiring choice architecture. Research Seminar, Dept of Family Medicine, McGill University, 10 Dec 2015.
15. Cockcroft A. Invited presentation. Inter-ministerial national structural intervention trial (INSTRUCT). Botswana National AIDS Council annual meeting. Gaborone, Botswana, 18 Aug 2015
16. Cockcroft A. Invited plenary presentation. Re-wiring choice architecture: structural interventions for HIV prevention. AIDSImpact conference, Amsterdam, Netherlands. 30 July 2015
17. Cockcroft A, Young women's knowledge about government structural support programmes in a district of Botswana. AfriCan Forum 2, Johannesburg, South Africa. 17 February 2015 [Poster]

7. Problems and challenges

The project was successful in many ways. Working in different districts across Botswana, we learned a lot about how to implement the complex intervention, and how to embed it within government and established community systems to support sustainability after the life of the funded project. The project was very well received throughout Botswana. Community leadership and district governments saw the logic of the approach and were optimistic that it would bear fruit. Our colleagues in NACA are convinced that structural interventions, such as those in INSTRUCT, are necessary to halt the HIV epidemic in Botswana. They have said they want to undertake with us some INSTRUCT interventions in other districts, with funding received by the Botswana government from the Global Fund.

We ran out of time and funding for a potentially game-changing approach. We extended the intervention from the first district a year later than originally planned, as it became clear the existing "institutional culture" (habits of doing things and ways of seeing clients) in service delivery was slow to change. We wanted full and effective implementation in the pilot district and to learn lessons we could apply in the other four districts. Subsequently, it became clear that the need for the interventions was even greater than anticipated at the outset and it required changes in institutional culture beyond what we could achieve within the original time frame, while allowing time for a full impact measurement, originally planned for the fourth year. We took the decision, after full discussion with the project officer, to continue the intervention into the fourth and fifth years and to seek funding for an extension of the project to accommodate the extended intervention period and a later impact assessment.

After many months of consideration, unfortunately IDRC did not agree to this request, alone or in partnership with other funding bodies. This ruled out completion as originally envisaged within the scope of an IDRC-funded initiative. We opted to avoid a premature impact assessment, which we knew would not allow sufficient time to show an impact but that would inevitably risk the mistaken conclusion that the intervention was not effective. We believe the intervention will be effective if given more time. To retain some value from the massive investment of effort in this IDRC-funded segment of INSTRUCT, we therefore focused on reporting the implementation research used to strengthen the intervention in ways that would be useful to the country and to the scientific directions the project developed.

We understand the possibility for additional funding to extend the project was limited because INSTRUCT was not funded as part of a larger program, and because Botswana is no longer a target country for IDRC and many other funding bodies. Botswana is a victim of its own success in transitioning to an upper middle-income country and showing progress against specified goals for controlling the HIV epidemic by biomedical means.

8. Administrative reflections and recommendations

Five years is the usual maximum for project funding. This is too short for structural intervention research and measurement of impact on behaviour change and HIV status. One possibility to tackle this problem is to build in options for funded extensions of projects, within specified parameters and conditioned by appropriate advances. This might be achieved through synergy projects linked to the main project, which funded researchers could apply for after making progress with the original project. We experienced this approach in the IMCHA program, and successfully applied for synergy funding that has allowed us to extend the scope of our initial project in Bauchi, Nigeria.